

REMARKS

Claims 1 through 13, 17 through 20 and new Claims 21 through 24 are pending in the application.

Claim 1 has been amended to reflect that the water vapor transmission rate is determined at 85 % relative humidity and 23 °C. Support for this amendment can be found in the Application as filed, for example on Page 11, lines 22 through 24.

Claim 1 has been amended to highlight that the resulting food casing is water resistant without crosslinking. Support for this amendment can be found in the Application as filed, for example on Page 4, lines 10 through 12.

Claims 2, 4 and 8 have been amended to correct typographical and clerical errors.

Claims 21 through 24 have been added to complete the record for examination and highlight particularly advantageous embodiments of the invention.

Claim 21 reflects advantageous inventive casings in which the water vapor transmission rate of the casing ranges from 72 to 200 g/m²·d. Support for Claim 21 can be found in the Application-as-filed, for example on Page 15, Table 2 and Claim 1 as-filed.

Claim 22 reflects advantageous inventive casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer. Support for Claim 22 can be found in the Application-as-filed, for example on Page 10, lines 13 through 16; Page 14, Table 1 and Page 6, lines 1 through 2.

Claim 23 reflects advantageous inventive casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) and the casing further exhibits an extraction loss ranging from 2.8 to 4.4 weight %, based on the weight decrease of the casing after storage for 1 hour in water at 80 °C and subsequent drying in vacuo. Support for Claim 23 can be found in the Application-as-filed, for example on Page 12, line 1 through Page 15, Table 2 and Page 11, lines 27 through 28.

Claim 24 reflects advantageous inventive casings that are mono-layered. Support for Claim 24 can be found in the Application-as-filed, for example on Page 12, lines 18 through 24, Examples 2 through 6.

Reexamination and reconsideration of this application, withdrawal of all rejections, and formal notification of the allowability of the pending claims are earnestly solicited in light of the remarks which follow.

Double Patenting

Claims 1 through 13 and 17 through 20 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting in light of the claims of co-pending Application No. 10/555,168. Co-pending Application No. 10/555,168 has a filing date of November 1, 2005, which is subsequent to the United States filing date of the above-referenced application. As explained in the remarks below, all other remaining rejections should be overcome, thus leaving this provisional rejection as the only rejection pending in this application. Following the guidelines of MPEP § 804(I)(B), Applicants respectfully request that the Examiner withdraw the provisional double patenting rejection in this case and permit Applicants to address the issue of double patenting in the later-filed remaining co-pending Application No. 10/555,168.

The Claimed Invention
is Patentable in Light of the Art of Record

Claims 1 through 5 and 17 through 19 stand rejected over European Patent Application 0 217 069 (EP 069) to Hisazumi et al. in view of United States Patent No. 4,514,472 (US 472) to Vrouenraets. Claims 6 through 11 and 20 stand rejected over the foregoing references and further in view of WIPO Published Application WO 94/16020 (WO 020) to Loomis et al. Claims 12 and 13 stand rejected over EP 069 and US 472 in further view of United States Patent No. 5,747,124 (US 124) to Pophusen et al.

It may be useful to briefly consider the invention prior to addressing the merits of the rejection.

There remains a need in the art for improved smoke-permeable food casings. Heretofore food casings intended for smoking have been formed from cellulose or collagen. Cellulose and collagen casings are known in the art to have elevated water vapour transmission rates (WVTRs), such as WVTRs of more than 500 g/m²d. The elevated WVTRs of cellulose and collagen casings allows sufficient smoke to penetrate the casing; however, the resulting sausages dry out in an unwanted manner when stored over time. In that regard, the Examiner's attention is kindly directed to the Application-as-filed on Page 1, lines 28 through 32.

For unsmoked sausage products, inexpensive casings made from conventional, i.e. water-insoluble, thermoplastics are known. Casings made out of water-insoluble thermoplastics have poor WVTRs, such as WVTRs ranging from about 3 to 20 g/m²d, making them unsuitable for smoking applications.

Water-soluble polymers are generally known. Little is known to-date of the thermoplastic deformation of water-soluble polymers; however, such as the thermoplastic deformation imparted during casing formation. Owing to their high polarity and the associated intermolecular

interactions, the melting point of water-soluble polymers is usually above their decomposition temperature, making such study difficult, at best. In addition, water-soluble polymers are not generally well suited for use in moist environments. Heretofore, it also has also been understood that articles made of water-soluble polymers would have to be subjected to a subsequent cross-linking treatment in order to render them water resistant. For example, if films are formed from polyvinyl alcohol blends are treated with hot water, the polyvinyl alcohol is extracted from the matrix, as evidenced in cited WO 020. Consequently, such blends are not suitable for producing films for encasing moist foods, as the dissolved polyvinyl alcohol would transfer onto the foodstuff and weaken the remaining casing, as alluded to in the Application-as-filed on Page 4, lines 24 through 31.

Surprisingly, Applicants have found that the inventive blends of aliphatic (co)polyamide and water-soluble polymer are water resistant without crosslinking, i.e. that virtually no water-soluble polymer is dissolved out by cold or hot water. Furthermore, the inventive blends are extrudable without decomposition and can be shaped to form tubular films, such as blown films.

Altogether unexpectedly, Applicants have additionally determined that films formed from the inventive blends having a water-vapor permeability ranging from at least 40 g/m²d up to 200 g/m²d (as measured at 85 % relative humidity and 23 °C) provide a heretofore unknown balance of adequate smoke permeability while minimizing the drying of the foods situated within the casing after smoking. Conventional wisdom to-date has instead indicated that altogether different variables, such as methanol-permeability (EP 069) or "phenol number" (US 472), effect casing smokability.

Accordingly, the claims are directed to smoke-permeable, moisture-resistant, tubular, biaxially oriented food casings formed from a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranges from 40 to 200 g/m²·d, measured at 85 % relative humidity and 23 °C, and the resulting casings are water resistant without crosslinking, as reflected in the claims as-amended.

In advantageous embodiments, the water vapor transmission rate of the inventive casings ranges from 72 to 200 g/m²·d (measured at 85 % relative humidity and 23 °C) as recited in newly added Claim 21.

In beneficial aspects, the inventive casings are formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22.

In particularly expedient embodiments, the which the water-soluble polymer used to form the inventive casings is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol), and the casing further exhibits an extraction loss ranging from 2.8 to 4.4 weight %, based on the weight decrease of the casing after storage for 1 hour in water at 80 °C and subsequent drying in vacuo, as recited in newly added Claim 23.

In especially advantageous embodiments, the inventive casings are mono-layered, as recited in newly added Claim 24.

The claimed invention is patentable in light of the cited references.

EP 069 is directed to smokeable film for packaging foods. The films of EP 069 include a layer comprising polyamide, an olefin-vinyl alcohol copolymer and polyolefin. (Page 4, first full paragraph and Page 12, first full paragraph). The majority of working examples of EP 069 have a WVTR of less than 40 g/m²·d (measured at a temperature of 40 °C and a relative air humidity of 90 %), with WVTR as low as 15 g/m²·d considered acceptable. (Page 18, Table 2; Page 24, Table 5 and Ex. 3, Table 2). Working examples having more elevated WVTRs are either unoriented or have a multilayered structure. (Page 25, Ex. 8 and Page 22, Ex. 4).

EP 069 notes on numerous occasions that films having a WVTR of more than $70 \text{ g/m}^2\text{d}$ (at a temperature of 40°C and a relative air humidity of 90 %) are outside the scope of its invention. (Page 4, first full paragraph; Page 5, first partial paragraph; Page 6, first partial paragraph). EP 069 indicates that compositions providing higher WVTRs suffer from “dryness of products in the smokable food-packaging film.” (Page 13, first partial paragraph). EP 069 instead teaches that methanol-permeability is the variable of interest in determining smokability. (Page 6, last full paragraph and Page 7, first full paragraph). In fact, EP 069 goes on to expressly note that components “other than methanol” are not related to smokability. (Page 8, second full paragraph).

As discussed within the Application-as-filed on Page 2, lines 29 through 32, the water vapour transmission rate of EP 069 (which Applicants respectfully submit was measured at both a higher temperature and higher relative humidity than in the claimed invention) is only a slight increase compared to traditional thermoplastic casings. Consequently, unsatisfactory smoke permeation would be expected for the films of EP 069 under customary smoking conditions.

Applicants thus respectfully submit that EP 069 does not teach or suggest the inventive smoke-permeable food casings incorporating a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranges from 40 to $200 \text{ g/m}^2\text{d}$, measured at 85 % relative humidity and 23°C . Applicants further respectfully submit that EP 069 clearly fails to even recognize water vapor transmission rate as a result effective variable in smoke-permeation. EP 069 instead expressly teaches methanol transport as the sole variable in determining smoke-permeation.

EP 069 also fails to teach or suggest that such casings are water resistant without crosslinking, as further recited in the claims as-amended.

Nor does EP 069 teach or suggest such inventive casings in which the water vapor transmission rate of the casing ranges from 72 to 200 g/m²·d, as recited in newly added Claim 21. EP 069 instead repeatedly teaches an absolute maximum WVTR of 70 g/m²·d.

EP 069, requiring olefin, likewise fails to teach or suggest advantageous casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22.

And EP 069 most certainly does not teach or suggest that advantageous casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) would exhibit an extraction loss ranging from 2.8 to 4.4 weight %, as recited in newly added Claim 23.

EP 069, expressly teaching unoriented or multilayered casings for more elevated WVTRs, likewise fails to teach or suggest the advantageous inventive biaxially oriented mono-layered casings exhibiting the claimed WVTR, as recited in newly added Claim 24.

Accordingly, Applicants respectfully submit that EP 069 does not teach or suggest the claimed invention, considered either alone or in combination with the remaining art of record.

US 472 similarly fails to teach or suggest the claimed invention.

US 472 is directed to films formed from thermoplastic copolyester incorporating both long-chain and short-chain ester units. (Col. 2, lines 1 – 6). US 472 specifically teaches copolyester consisting of polybutylene terephthalate and a particular glycol. (Col. 4, lines 46 – 54). US 472 teaches that the “film of this invention may be drawn or not.” (Col. 4, line 55). US 472 indicates that films should be assessed for smoke permeation based on their “phenol number” or “acid number” or “aldehyde number.” (Col. 5, lines 10 – 67). The sole reference within US 472 to WVTR is in reference to a working example, noted to have a WVTR of 800

$\text{g/m}^2\text{d}$, measured at a temperature of $30\text{ }^{\circ}\text{C}$ and a relative air humidity of 50 %. (Col. 10, lines 43 – 45).

Applicants thus respectfully submit that US 472 does not teach or suggest the inventive smoke-permeable food casings incorporating a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranges from 40 to $200\text{ g/m}^2\text{d}$, measured at 85 % relative humidity and $23\text{ }^{\circ}\text{C}$. The sole reference to WVTR within US 472 instead indicates that a WVTR of $800\text{ g/m}^2\text{d}$ is acceptable.

US 472 also fails to teach or suggest that such casings are water resistant without crosslinking, as further recited in the claims as-amended.

Nor does US 472 teach or suggest such inventive casings in which the water vapor transmission rate of the casing ranges from 72 to $200\text{ g/m}^2\text{d}$, as recited in newly added Claim 21.

US 472, requiring copolyester, likewise fails to teach or suggest advantageous casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22.

And US 472 most certainly does not teach or suggest that advantageous casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) would exhibit an extraction loss ranging from 2.8 to 4.4 weight %, as recited in newly added Claim 23.

Accordingly, Applicants respectfully submit that US 472 does not teach or suggest the claimed invention, considered either alone or in combination with the remaining art of record.

There would have been no motivation to have combined EP 069 and US 472. However, even if Applicant had combined EP 069 and US 472 (which they did not) the claimed invention would not have resulted.

The combination does not teach or suggest the inventive smoke-permeable food casings incorporating a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranging from 40 to 200 g/m²·d, measured at 85 % relative humidity and 23 °C, much less that such casings are water resistant without crosslinking, as further recited in the claims as-amended.

Nor does the combination teach or suggest such inventive casings in which the water vapor transmission rate of the casing ranges from 72 to 200 g/m²·d, as recited in newly added Claim 21. The primary reference instead teaches a maximum of 70 g/m²·d WVTR.

The combination likewise fails to teach or suggest advantageous casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22. The primary reference requires polyolefin thermoplastic, while the secondary reference requires copolyester thermoplastic.

And the combination most certainly does not teach or suggest that advantageous casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) would exhibit an extraction loss ranging from 2.8 to 4.4 weight %, as recited in newly added Claim 23.

The combination likewise fails to teach or suggest the advantageous biaxially oriented mono-layered casings exhibiting the claimed WVTR, as recited in newly added Claim 24. The primary reference instead expressly teaches either unoriented or multilayered casings for more elevated WVTRs.

Accordingly, Applicants respectfully submit that EP 069 and US 472 do not teach or suggest the claimed invention, considered either alone or in combination with each other or any or all of the remaining art of record.

Claims 6 through 11 and 20 are similarly patentable in further light of WO 020.

WO 020 is directed to thermoplastic biodegradable blends of two polymers, each of which is biodegradable. (Page 7, lines 25 – 27). The rate of biodegradation of the first polymer is enhanced by the degradation of the second polymer. (Page 7, lines 27 – 31). WO 020 generically teaches that its biodegradable thermoplastic polymer blend compositions may be used to manufacture “shaped articles,” such as “sheets suitable for use in the production of food product tubs” or films suitable for compost bags. (Page 1, lines 10 – 13 and Page 22, lines 34 - 35). Exemplary first polymers include polyamide and polyesters, and second polymers include polylactide and other aliphatic polyesters. (Page 9, lines 21 – 32 and Page 11, lines 28 – 29). WO 020 evidences traditional wisdom, noting that conventional polyvinyl alcohol is generally not considered to be a thermoplastic. (Page 1, lines 19 – 20; Page 34, lines 34 - 35). WO 020 further notes that a polysaccharide, such as starch, may be included in the compositions in applications in which “rapid disintegration” is desirable. (Page 14, lines 8 – 14).

The working examples are primarily directed to blends of ethylene vinyl alcohol and polyvinyl alcohol, which are injected molded into tensile bars for testing. (Page 26, lines 18 – 29). WO 020 expressly teaches repeatedly that the polyvinyl alcohol is extracted from the finished article using water. (Page 30, lines 20 – 30; Page 31, lines 5 – 13; Page 32, line 46 – Page 33, line 3; Page 35, lines 19 – 21). WO 020 teaches that its blends may have an exemplary WVTR of 13,000 g/mil/100 in²/day. (Page 37, lines 20 – 25).

Applicants respectfully submit that if films formed from the blends of WO 020 are treated with hot water, the polyvinyl alcohol would be extracted from the matrix. Consequently, such blends are not suitable for producing films for encasing moist foods, as noted in the Application-as-filed on Page 4, lines 24 through 31.

Accordingly, WO 020 clearly fails to teach or suggest the inventive casings, which are water resistant without crosslinking, as recited in the claims as-amended. In fact, Applicants respectfully submit that to modify WO 020 so as to avoid the required extraction of the second polymer would render it unfit for its intended purpose.

WO 020, directed to food tubs and compost bags, further does not teach or suggest the inventive smoke-permeable food casings incorporating a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranges from 40 to 200 g/m²·d, measured at 85 % relative humidity and 23 °C.

Nor does WO 020 teach or suggest such inventive casings in which the water vapor transmission rate of the casing ranges from 72 to 200 g/m²·d, as recited in newly added Claim 21.

WO 020 likewise fails to teach or suggest advantageous casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22.

And WO 020 most certainly does not teach or suggest that advantageous casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) would exhibit an extraction loss ranging from 2.8 to 4.4 weight %, as recited in newly added Claim 23.

Accordingly, Applicants respectfully submit that WO 020 does not teach or suggest the claimed invention, considered either alone or in combination with the remaining art of record.

The claimed invention is patentable in light of EP 069 and US 472, as discussed in the preceding remarks.

There would have been no motivation to have combined EP 069, US 472 and WO 020. However, even if Applicant had combined EP 069, US 472 and WO 020 (which they did not) the claimed invention would not have resulted.

The combination does not teach or suggest the inventive smoke-permeable food casings incorporating a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranges from 40 to 200 g/m²·d, measured at 85 % relative humidity and 23 °C, much less that such casings are water resistant without crosslinking, as further recited in the claims as-amended.

Nor does the combination teach or suggest such inventive casings in which the water vapor transmission rate of the casing ranges from 72 to 200 g/m²·d, as recited in newly added Claim 21. The primary reference instead teaches a maximum of 70 g/m²·d WVTR.

The combination likewise fails to teach or suggest advantageous casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22. The primary reference requires pololefin thermoplastic, while the secondary reference requires copolyester thermoplastic.

And the combination most certainly does not teach or suggest that advantageous casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) would exhibit an extraction loss ranging from 2.8 to 4.4 weight %, as recited in newly added Claim 23.

The combination likewise fails to teach or suggest the advantageous biaxially oriented mono-layered casings exhibiting the claimed WVTR, as recited in newly added Claim 24. As noted above, the primary reference instead expressly teaches either unoriented or multilayered casings for more elevated WVTRs.

Accordingly, Applicants respectfully submit that EP 069, US 472 and WO 020 do not teach or suggest Claims 6 through 11, 20 and new Claims 21 through 24, considered either alone or in combination with each other or any or all of the remaining art of record.

Claims 12 and 13 are likewise patentable in further light of US 124.

US 124 is directed to at least 4 layer casings having improved burst properties. (Col. 1, lines 4 – 7). US 124 incorporates two outer layers formed from polyamide. (Col. 3, lines 23 – 31 and Col. 6, lines 4 - 10). The films of US 124 include a water vapour barrier layer formed from polyolefin. (Col. 3, lines 23 – 35). The films of US 124 are formed via a “double-bubble” process, with the total degree of transverse stretching ranging between 65 % and 85 % of the total degree of longitudinal stretching. (Col. 3, lines 45 – 55).

US 124 thus does not teach or suggest the inventive smoke-permeable food casings incorporating a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranges from 40 to 200 g/m²-d, measured at 85 % relative humidity and 23 °C. US 124, considered in its entirety, instead teaches away from the claimed invention by incorporating a water vapour barrier layer.

US 124 also fails to teach or suggest that such casings are water resistant without crosslinking, as further recited in the claims as-amended.

Nor does US 124 teach or suggest such inventive casings in which the water vapor transmission rate of the casing ranges from 72 to 200 g/m²·d, as recited in newly added Claim 21. EP 069 instead repeatedly teaches an absolute maximum WVTR of 70 g/m²·d, while US 124 incorporates a water vapour barrier layer.

US 124 likewise fails to teach or suggest advantageous casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22.

And US 124 most certainly does not teach or suggest that advantageous casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) would exhibit an extraction loss ranging from 2.8 to 4.4 weight %, as recited in newly added Claim 23.

Accordingly, Applicants respectfully submit that US 124 does not teach or suggest the claimed invention, considered either alone or in combination with the remaining art of record.

The claimed invention is patentable in light of EP 069 and US 472, as discussed in the preceding remarks.

There would have been no motivation to have combined EP 069, US 472 and US 124. However, even if Applicant had combined EP 069, US 472 and US 124 (which they did not) the claimed invention would not have resulted.

The combination does not teach or suggest the inventive smoke-permeable food casings incorporating a mixture of at least one aliphatic (co-)polyamide and at least one water-soluble synthetic polymer, in which the water vapor transmission rate of the casing ranges from 40 to 200 g/m²·d, measured at 85 % relative humidity and 23 °C, much less that such casings are water resistant without crosslinking, as further recited in the claims as-amended.

Nor does the combination teach or suggest such inventive casings in which the water vapor transmission rate of the casing ranges from 72 to 200 g/m²·d, as recited in newly added Claim 21. The primary reference instead teaches a maximum of 70 g/m²·d WVTR.

The combination likewise fails to teach or suggest advantageous casings formed from a mixture of (i) thermoplastic consisting of one or more aliphatic (co-)polyamides and (ii) at least one water-soluble synthetic polymer, as recited in newly added Claim 22. The primary reference requires polyolefin thermoplastic, while the secondary reference requires copolyester thermoplastic.

And the combination most certainly does not teach or suggest that advantageous casings in which the water-soluble, synthetic, organic polymer is a mixture of partially or completely saponified poly(vinyl alcohol) and a poly(alkylene glycol) would exhibit an extraction loss ranging from 2.8 to 4.4 weight %, as recited in newly added Claim 23.

The combination likewise fails to teach or suggest the advantageous biaxially oriented mono-layered casings exhibiting the claimed WVTR, as recited in newly added Claim 24. The primary reference instead expressly teaches either unoriented or multilayered casings for more elevated WVTRs. The tertiary reference requires an at least 4 layer casing.

Accordingly, Applicants respectfully submit that EP 069, US 472 and US 124 do not teach or suggest Claims 12, 13 and new Claims 21 through 24, considered either alone or in combination with each other or any or all of the remaining art of record.

CONCLUSION

It is respectfully submitted that Applicants have made a significant and important contribution to the art, which is neither disclosed nor suggested in the art. It is believed that all of pending Claims 1 through 13 and 17 through 24 are now in condition for immediate allowance. It is requested that the Examiner telephone the undersigned if any questions remain to expedite examination of this application.

It is not believed that extensions of time or fees are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time and/or fees are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required is hereby authorized to be charged to Deposit Account No. 50-2193.

Respectfully submitted,

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